CLAIMS

1. A method for providing a connection between an embedded fibre optic and a surface connector, the method comprising:

providing a substrate comprising an embedded fibre connector component;

forming a trench from the surface of the substrate to the embedded fibre connector to expose the embedded fibre connector component; and

forming a fibre abutment connection between the embedded fibre connector component and a fibre optic, wherein the fibre optic is for guiding radiation between the embedded fibre connector component and a surface connector.

2. The method of Claim 1, further comprising providing a plurality of embedded fibre connector components.

3. The method of any preceding claim, comprising locating an embedded element to identify the position of the embedded fibre connector component.

4. The method of Claim 3, comprising endowing the embedded element with one or more properties that can be used to identify the depth at which the embedded element is embedded in the substrate.

5. The method of any preceding claim, wherein the trench is for guiding the fibre optic towards the embedded fibre connector component for forming the fibre abutment connection.

6. The method of Claim 5, wherein the trench is formed by operating a CO laser and/or an Excimer laser operated under machine control.

7. The method of Claim 5 or Claim 6, wherein the trench has a linear profile or a lazy S-shaped profile.

8. The method of any preceding claim, wherein exposing the embedded fibre connector component comprises removing a filler material from proximal to at least a portion of the embedded fibre connector component.

9. The method of any preceding claim, wherein exposing the embedded fibre connector component comprises removing a plug therefrom.

10. The method of any preceding claim, wherein forming a fibre abutment connection comprises providing self-aligning fibre optic and embedded fibre optic cores.

11. The method of any preceding claim, wherein forming a fibre abutment connection comprises providing index matching between the fibre optic and the embedded fibre optic.

12. The method of any preceding claim, comprising sealing the fibre abutment connection into the substrate.

13. A method of manufacturing a substrate, comprising:

providing an embedded fibre optic optically connected to an embedded fibre connector component for forming a fibre abutment connection with a fibre optic, wherein the embedded fibre optic and the embedded fibre connector are embedded in the substrate; and

forming a trench from a surface of the substrate to the embedded fibre connector to expose the embedded fibre connector component.

14. The method of Claim 13, comprising providing an embedded element for identifying the position of the embedded fibre connector component proximal to the embedded fibre connector component.

15. The method of any one of Claim 13 or Claim 14, wherein the embedded element is endowed with one or more properties that can be used to identify the depth at which the embedded element is embedded in the substrate.

16. The method of any one of Claims 13 to 15, comprising providing a filler material proximal to at least a portion of the embedded fibre connector component.

17. The method of any one of Claims 13 to 16, comprising providing the embedded fibre connector component with a plug.

18. The method of any one of Claims 13 to 17, comprising providing guide for aligning a fibre optic core with a fibre core of the embedded fibre optic.

19. The method of any one of Claims 13 to 18, comprising providing one or more composite material layers to form the substrate.

20. The method of Claim 19, wherein each composite material layer comprises respectively aligned material fibres.

21. The method of Claim 20, further comprising selecting the material fibres from one or more of the following materials: plastic, carbon, glass, metal and Kevlar.

22. The method of any one of Claims 13 to 21, comprising potting the embedded fibre connector component into a recess in a substrate support layer.

23. The method of any one of Claims 13 to 22, further comprising providing a plurality of embedded fibre connector components within the substrate.

24. A substrate comprising an embedded fibre connector component and an embedded fibre optic optically connected to the embedded fibre connector component for forming a fibre abutment connection with a fibre optic, wherein the substrate further comprises a trench formed from a surface of the substrate to the embedded fibre connector component.

25. The substrate of Claim 24, further comprising an embedded element for identifying the position of the embedded fibre connector component, wherein the embedded element is sited proximal to the embedded fibre connector component.

26. The substrate of Claim 24 or Claim 25, wherein the embedded element is endowed with one or more properties that can be used to identify the depth at which the embedded element is embedded in the substrate.

27. The substrate of any one of Claims 24 to 26, further comprising a filler material provided proximal to at least a portion of the embedded fibre connector component.

28. The substrate of any one of Claims 24 to 27, wherein the embedded fibre connector component is provided with a plug.

29. The substrate of any one of Claims 24 to 28, wherein the embedded fibre connector component is provided with a guide for aligning a fibre optic core with a fibre core of the embedded fibre optic.

30. The substrate of any one of Claims 24 to 29, comprising one or more composite material layers.

31. The substrate of Claim 30, wherein each composite material layer comprises respectively aligned material fibres.

32. The substrate of Claim 31, wherein material fibres comprise one or more of the following materials: plastic, carbon, glass, metal and Kevlar.

33. The substrate of any one of Claims 24 to 32, wherein the embedded fibre connector component is potted into a recess in a substrate support layer.

34. The substrate of any one of Claims 24 to 32, comprising a plurality of embedded fibre connector components.

35. A panel for a vehicle fuselage, component, body or hull, comprising the substrate according to any one of Claims 24 to 34.

36. A vehicle comprising a panel according to Claim 35.

37. A method of manufacturing a vehicle, comprising incorporating a panel according to Claim 35 into a vehicle fuselage, component, body or hull.

38. A connector component for providing a fibre abutment connection between a fibre optic and the embedded fibre connector component(s) of any one of Claims 24 to 34.

39. A machine system operable to expose the embedded fibre connector component according to any preceding Claim.

40. The machine system of Claim 39, further operable to control a CO laser and/or an Excimer laser.

41. The machine system of Claim 39 or Claim 40, operable under computer control.

42. The machine system of any one of Claims 39 to 41, operable automatically to expose a trench of at least one predetermined profile.

43. The machine system of Claim 42, operable automatically to:

identify a depth and position of an embedded fibre connector component;

identify a suitable predetermined trench profile for the identified depth; and

create a trench corresponding to the suitable predetermined trench profile in order to expose the embedded fibre connector component.

44. A program product comprising a carrier medium having program instruction code embodied in the carrier medium, the program instruction code comprising instructions for configuring at least one data processing apparatus to provide the machine system according to any one of Claims 39 to 43.

45. The program product according to Claim 44, wherein the carrier medium includes at least one of the following set of media: a radio-frequency signal, an optical signal, an electronic signal, a magnetic disc or tape, solid-state memory, an optical disc, a magneto-optical disc, a compact disc and a digital versatile disc.

46. A method for providing a connection between an embedded fibre optic and a surface connector substantially as hereinbefore described with reference to the accompanying drawings.

47. A method of manufacturing a substrate substantially as hereinbefore described with reference to the accompanying drawings.

48. A substrate comprising an embedded fibre connector component substantially as hereinbefore described with reference to Figures 1, 2a, 2b, 3 to 10 and 17 of the accompanying drawings.

49. A panel for a vehicle fuselage, component, body or hull, substantially as hereinbefore described with reference to Figure 17 of the accompanying drawings.

50. An aircraft substantially as hereinbefore described with reference to Figure 17 of the accompanying drawings.

51. A method of manufacturing a vehicle substantially as hereinbefore described with reference to the accompanying drawings.

52. A connector component for providing a fibre abutment connection between a fibre optic and an embedded fibre connector substantially as hereinbefore described with reference to Figures 3 to 5, 13, 14 and 17 of the accompanying drawings.

53. A machine system substantially as hereinbefore described with reference to the accompanying drawings.

54. A program product substantially as hereinbefore described with reference to the accompanying drawings.